How to swim with sharks?

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APPENDIX A

To test the right and left shift of the turning point of the inverted U curve when CN and TN small-word Q is high, we assessed whether the value $\frac{\delta X^*}{\delta M}$ as a whole is significantly different from zero and used "nlcom" command recommended by Haans et al. (2016). According to their paper, if $Y = \beta_0 + \beta_1 + \beta_2 X^2 + \beta_3 XM + \beta_4 X^2 M + \beta_5 M$, then $\frac{\delta X^*}{\delta M} = \frac{\beta_1\beta_4 - \beta_2\beta_3}{2(\beta_2 + \beta_4 M)^2}$ (here, M refers to the moderating variable). We found that the turning point of the inverted U relationship between the direct coopetition network and knowledge recombinant capabilities significantly moves left or right when CN_Q or TN_Q is high (CN_Q: z = 2.05, $p < 0.05$; TN_Q: z = -2.18, $p < 0.05$). Furthermore, we tested the up and down shift of the turning point. Since Haans et al. (2016) did not provide the test, we derive a formula as follows:

$$Y = \beta_0 + \beta_1 + \beta_2 X^2 + \beta_3 XM + \beta_4 X^2 M + \beta_5 M$$

$$Y = (\beta_2 + \beta_4 M) X^2 + (\beta_1 + \beta_3 M) X + (\beta_0 + \beta_5)$$

$$\begin{aligned}\frac{\delta Y^*}{\delta M} &= \beta_5 - \left(\frac{(\beta_1 + \beta_3 M)^2}{4(\beta_2 + \beta_4 M)}\right) \\ &= \beta_5 - \frac{8\beta_3(\beta_1 + \beta_3 M)(\beta_2 + \beta_4 M) - 4\beta_4(\beta_1 + \beta_3 M)^2}{16(\beta_2 + \beta_4 M)^2} \\ &= \beta_5 - \frac{(\beta_1 + \beta_3 M)(2\beta_2\beta_3 + \beta_3\beta_4 M - \beta_1\beta_4)}{4(\beta_2 + \beta_4 M)^2}\end{aligned}$$

Using this method, we found that the up or down shift of the turning point are miniscule (CN_Q: z = -1.30, p > 0.1; TN_Q: z = 0.04; $p > 0.1$).

APPENDIX B

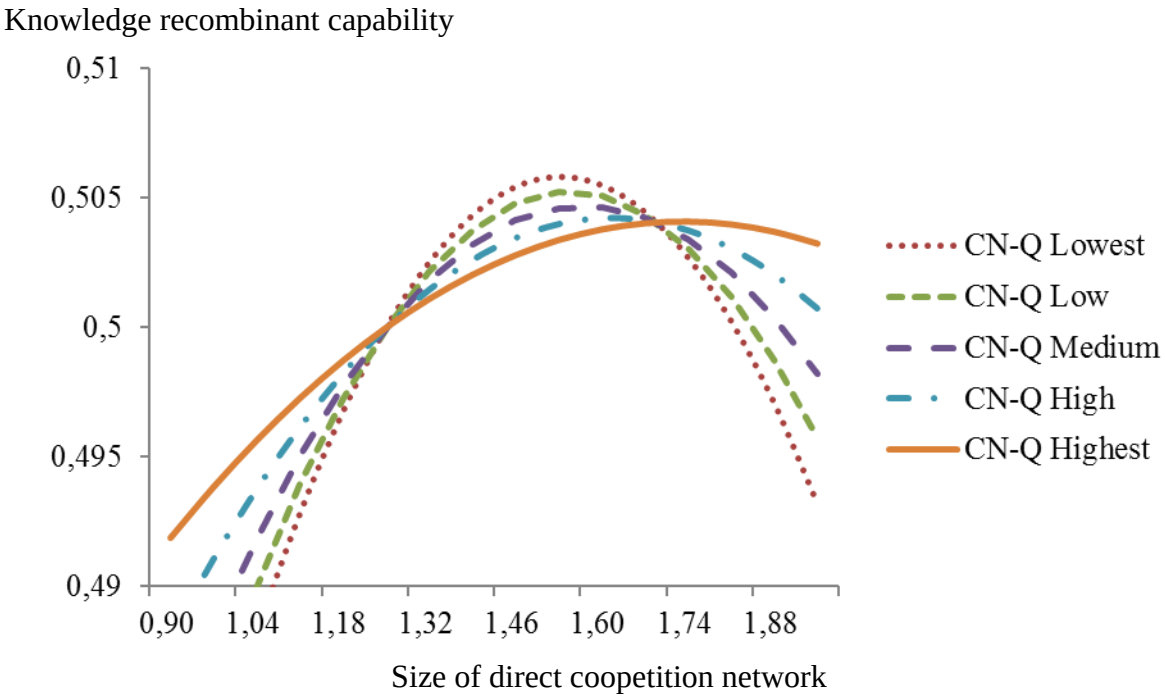

Figure B1. Interaction Plot of the Direct Coopetition Network and Internal CN_Q

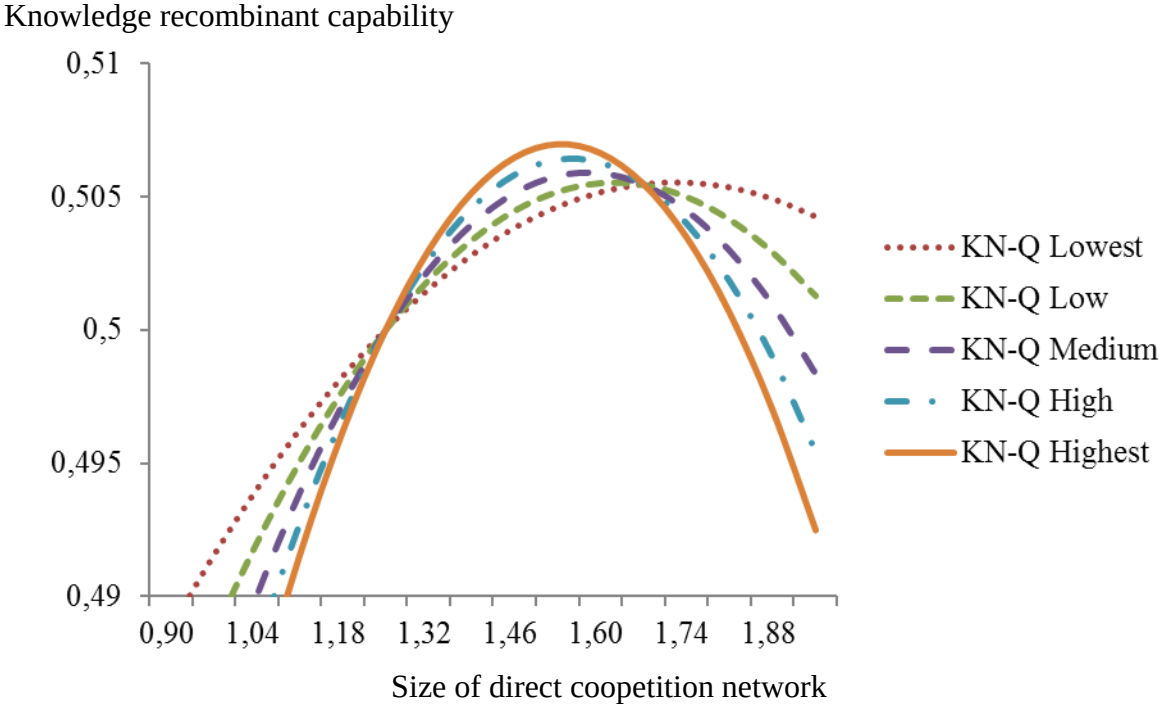

Figure B2. Interaction Plot of the Direct Coopetition Network and Internal TN_Q